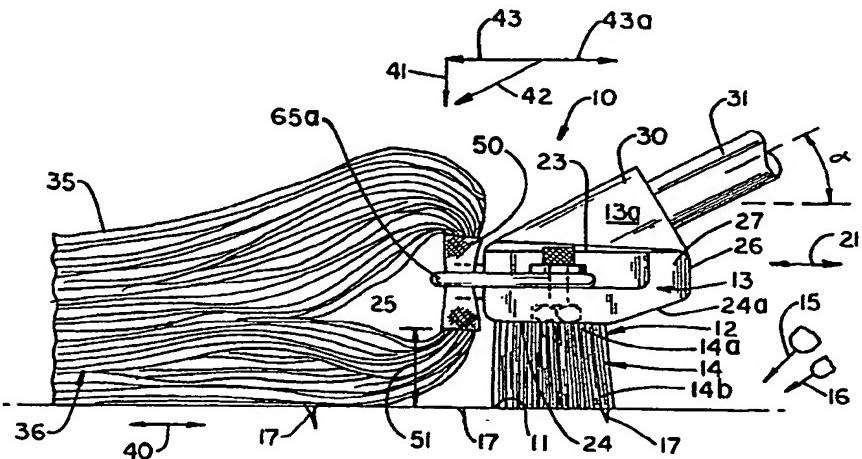




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(54) Title: SCRUBBING AND MOPPING APPARATUS AND SURFACE TREATMENT METHOD



(57) Abstract

An apparatus (10) for scrubbing and mopping a surface (11), comprising in combination, a supporting carrier (13), including a block and scrubbing media (12, 90) carried by the carrier, to project toward the surface for scrubbing that surface; first structure (30) for attaching an elongated handle (31) to the carrier (13) to extend in a first direction from the carrier; and second manually manipulable structure (65) for attaching a mop (35) to the carrier (13), with mop strands (36) extending in generally parallel relation with that surface and in mopping contact therewith, as the scrubbing media (12, 90) simultaneously engages that surface, for simultaneous mopping and scrubbing of that surface, as the handle (31) extends at an angle to the surface to display the carrier (13), bristles (14) and mop (35) parallel to the surface, and to transmit downward force to the scrubbing means (12, 90); structure including a transversely lengthwise extending bar (65), about which a portion of the mop (35) extends; and there being at least one projection (68) on the carrier (13) for engaging the mop (35) to block bodily movement of said mop portion transversely lengthwise of the bar (65).

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SCRUBBING AND MOPPING APPARATUS AND SURFACE TREATMENT METHOD

BACKGROUND OF THE INVENTION

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This invention relates generally to treatment such as cleaning of surfaces, and more particularly, to improvements in apparatus for scrubbing and mopping of surfaces by force application, as via an elongated handle; and surface treatment methods, including substantially simultaneous application to such surfaces of pesticide and traction treatment materials, as for example prior to or subsequent to surface cleaning.

Many surfaces to be cleaned contain interstices, cracks or crevices, in which dirt particles become embedded, or otherwise build up. Examples are cracks between tiles forming tiled surfaces, cracks and crevices in marble, clay, concrete, or synthetic material flooring, and surface interstices in many different types of floors. It is extremely difficult to remove such embedded or built up dirt particles using conventional mopping apparatus and/or procedure. It becomes necessary to scrub such surfaces, using a brush or brushes having bristles that can reach and remove the embedded soil or dirt particles.

In the past, it was known to provide for scrubbing and mopping of floor surfaces, using elongated handled equipment; however, such equipment lacked the unusually advantageous improvements in structure, functions and results, as are now enabled and produced by the present invention, and meeting needs for improved and more effective use and operation, as will appear.

SUMMARY OF THE INVENTION

25

It is a major feature of the invention to provide improved method and apparatus meeting the above needs. Basically, the apparatus of the invention includes the following:

- a) a supporting carrier, including a block and scrubbing means carried by the carrier, to project toward a surface to be cleaned, for scrubbing that surface,
- 30 b) first means for attaching an elongated handle to the carrier to extend in a first direction from the carrier,
- c) and structure for attaching a mop to the carrier to extend in generally parallel relation with that surface and in mopping contact therewith as the scrubbing means simultaneously engages that surface, for mopping and scrubbing the surface simultaneously as

the handle extends at an angle to the surface to displace the carrier, scrubbing means and mop parallel to the surface,

d) said structure including a transversely lengthwise extending bar, about which a portion of the mop extends,

5 e) and there being at least one projection on the carrier for engaging the mop to block bodily movement of said mop portion transversely lengthwise of the bar.

It is another feature of the invention to provide such a device wherein the mop has a head attached by the bar to the carrier proximate a first side of the carrier, which extends laterally to provide support and stability for both the mop and the scrubbing means.

10 It is another feature of the invention to provide a device, as referred to, wherein the handle is attached to the carrier at a second side of the carrier, typically spaced from the location of mop head attachment to the carrier.

15 A further feature of the invention is to provide manually manipulable structure in the form of a bar or bail carried by the carrier to adjustably swing into mop head clamping position.

20 Yet another feature of the invention is to provide manually manipulable structure that includes an adjustable clamp for adjustably clamping the mop head and having a first position in which the mop head is removable from attachment to the carrier, and a second position in which the mop head is attached to the carrier. In this regard, the carrier block has projections which positively engage the mop head to lock it against lateral movement, during use of the 25 mop.

A still further feature includes provision of a bar or bail in the form of a lever having an over-center pivoted and retained position in which the mop head is positively clamped.

An additional feature of the invention includes provision of bristles, or a scrub pad 25 attached to the underside of the carrier block. The bristles, or scrub pad can be attached by a releasable fastening means, as for example by VELCRO attachment, enabling removal and replacement.

30 The apparatus of the present invention can be used for cleaning floors with tough dirt, stuck litter and oil stains. The cleaning apparatus is especially suitable for cleaning industrial floors, such as the floors of restaurants' kitchens, which usually are made of clay or concrete, with rough and porous surfaces to protect slipping. Advantageously, the cleaning apparatus of the present invention can perform surface cleaning and scrubbing and/or brushing functions simultaneously and conveniently by providing a mop and scrubbing block being removably and adjustably installed in a single assembly. An additional feature of the invention is to

provide a surface treatment method, which includes:

- a) applying a flowable pesticide material to the surface, as for example to corners and crevices of a room,
- b) and applying a flowable surface restorative or traction material to the surface, 5 as for example a walkway, such application being location and timewise related, as for example, to contiguous surfaces in a room, and the application effected during the same work period.

Selected portions or excess portions of the applied materials may be removed by providing and passing at least one mop over and in contact with the flowable material or 10 materials on the surface or surfaces..

These and other features and advantages of the invention, as well as the details of an illustrative embodiment, will be more fully understood from the following specification and drawings, in which:

15

DRAWING DESCRIPTION

Fig. 1 is a top plan view of apparatus embodying the invention;

Fig. 2 is a side elevation taken on lines 2-2 of Fig. 1;

Fig. 3 is a section taken on lines 3-3 of Fig. 1;

20 Fig. 4 is a fragmentary front elevation taken on lines 4-4 of Fig. 3;

Fig. 5 is a top plan view of a block, and mop retention bar;

Fig. 6 is a front elevation taken on lines 6-6 of Fig. 5;

Fig. 7 is a rear elevation taken on lines 7-7 of Fig. 5;

Fig. 8 is an end elevation taken on lines 8-8 of Fig. 6;

25 Fig. 9 is an end elevation of a carrier block, showing removable attachment of a scrub pad;

Fig. 10 is an end elevation of a carrier block showing removable attachment of scrub bristles; and

30 Fig. 11 is a side elevation like Fig. 2, but showing the carrier block and mop in inverted position.

DETAILED DESCRIPTION

In Figs. 1 and 2, a preferred form of the apparatus 10, for scrubbing and mopping a surface 11, such as a floor, is shown in operating position. The basic elements comprise a

floor scrubbing means, one example of which is a scrub brush 12. The brush has bristles 14 having their upper ends 14a carried by the carrier 13 at its underside. The bristles project, as for example, downwardly as shown, toward the surface 11 in position for contacting that surface at bristle lower ends 14b.

5 Water and/or chemical cleaner may be applied to that surface, as at 15 and 16, to aid in bristle dislodgment of soils, grit and dirt particles from interstices and cracks in that surface. These are indicated at 17, and may take various forms.

Carrier 13 is typically laterally elongated in directions 19, as seen in Fig. 1, and relative to longitudinal direction 21. Carrier 13 may consist of molded plastic, or other 10 material such as wood, and has an upper side 23, a bottom side 24 from which the bristles project, a front side 25, a rear side 26, and opposite ends 27 and 28. Side 25 may be perpendicular, or substantially perpendicular, to direction 21, and to the planes of upper and lower sides 23 and 24. Surface 24 may be beveled as at 24a, to facilitate rocking of the carrier, as during use.

15 First means is provided, as at 30, for attaching an elongated handle 31 to the carrier, to extend in a first direction from the carrier, which may have block shape. Such first means may, for example, include female screw threading at 32 formed in a recess 33 sunk downwardly and forwardly in a protrusion 13a at the carrier top side 23, mid-way between opposite ends 27 and 28. The lower end portion 31a of the handle may form or carry 20 complementary male threading to rotatably attach to threading 32, whereby the handle is firmly connected to the carrier, to extend upwardly and rearwardly at an angle relative to and above longitudinal direction or axis 21. Note handle axis 31b in Fig. 3.

A mop seen at 35 has flaccid strands 36 shown as extending forwardly of the front side 25 of the carrier in direction 37. Manually manipulable structure is provided for 25 adjustable attaching the mop to the carrier 13, whereby the strands 36 extend in generally parallel relation with surface 11, the lower strands freely engaging that surface, for mopping same when the carrier 13 is moved frontwardly and rearwardly in directions 40, as seen in Fig. 2, and simultaneously with bristle scrubbing engagement with the surface, achieving simultaneous scrubbing and mopping of surface 11.

30 Accordingly, the downward component 41 of handle force 42 exerted on carrier 13 acts to push the bristles downwardly into and over the crevices, cracks and interstices 17 at the same time as the forward component 43 of handle force pushes or displaces the flaccid mop strands 36 forwardly, and subsequently the rearward component 43a of handle force pulls the strands 36 rearwardly over the interstices and cracks 17, to displace liquid into and

from the crevices and cracks 17, carrying away or removing the bristle loosened soils and dirt. Fresh, aqueous liquid and/or cleaner is simultaneously mopped into the crevices or cracks to aid in loosening remnant soils and dirt, as the bristles are subsequently displaced forwardly again, with downward force component applicable at 41 to further or complete the soils and dirt loosening in the cracks and crevices filled with mopped liquid. The downwardly yieldable resilient spring aspect of the relatively stiff bristles assists in their penetration of the cracks and crevices under the influence of the downward force component 41.

The mop 35 has flaccid strand lateral dimension approximating or exceeding the lateral dimension 44a of the brush carrier, and bristles, whereby the simultaneous mopping and scrubbing effect, as described, is attained throughout the approximately equal lateral extents of the carrier and mop.

Further, attachment of the mop head or band 50 proximate the front side 25 of the carrier 13, above the level of the floor (see dimension 51 in Fig. 2) attains maximum proximity of the main extent of the mop to the floor 11, to enhance mopping and scrubbing effect, as described, while also facilitating direct, forward and rearward force transmission from the carrier to the mop head 50 and to the mop 35, for ease of required force transmission (push and pull) to the handle from the user's arm.

The mop head 50 consists of a tightly gathered bundle of mop strand portions, which may be held clamped together, as at 50a by semi-rigid band 50b, having band forward and rearward extents 50c and 50d as seen in Fig. 3. The tight bundle also provides a semi-rigid support and holder for attachment of the mop head to the front side 25 of the carrier 13, with the laterally elongated head 50 extending in parallel relation to the laterally elongated carrier front side or side wall 25. A mutually supporting relation of the head and carrier is thereby achieved. Whereby the head does not move back and forth laterally, relative to the carrier.

Manually adjustable structure is provided for adjustably attaching the mop head to the carrier 13. The adjustable structure includes a retainer bar or bail 65 carried by carrier 13 to adjustably swing about an axis 66, into mop head clamping position, i.e., the position seen in Fig. 1. The bail has turned and pivotal attachment, as at 67, to a post 100 in side opening 67a in wall 27 of the carrier 13, whereby bail cross bar 65a can be swung outwardly away from front wall 25, allowing the mop head to be fitted over the bar 65a, and subsequently swung inwardly to Fig. 1 position. In that position the mop head 50 is clamped between cross bar 65a and first wall 25, with multiple forward projections or barbs 68 on the carrier positively engaging and penetrating the mop head to lock it in position. The barbs are also seen in Fig. 6. The head includes a fabric band to be engaged by the barbs. Bar 65a clamps the front side

of the band, in Fig. 1. See also the larger locator projection **68a** on the carrier penetrating the centering grommet **70** fixed on the head **50**. Multiple lateral point positive locking support of the mop head is thereby achieved, locating it against slippage up or down, or sidewise, from the position shown.

5 Fig. 1 also shows the angled end extent **65b** of the bar, retained against angle surface portion **28a** of the block, and reversely angled end extent **65c** of the bar, retained by a clip **73** on the block. Bar turned end **65d** serves as a handle. The block end is notched at **74** and accommodates **28a**, **65b**, **65c** and **73**. To free the bar and extents **65b** and **65c** from locked position, the handle **65d** is pushed to the right in Fig. 1, to free **65c** from the U-shaped clip **73**,

10 and then raised out of the notch **74**, whereby the bar can be pivoted to Fig. 5 position, and to broken line position **65e**, allowing mop replacement.

15 Fig. 9 is like Fig. 1 excepting that a scrubbing pad **90** is substituted for the bristles. A releasable mechanical fastener attachment of the pad to the underside of the block is shown at **91** and **92**. Optimally, the mop may be removed, during scrubbing, or the pad removed during mopping.

Fig. 10 shows parallel rows of bristles **94** carried by a support **95** attached by releasable mechanical fastener to the underside of the block **13**, as at **92** and **93**. Brush structure is thereby provided, at **96**.

20 Fig. 11 shows the capability of the invention for use in inverted position, for scrubbing using the mop itself. Note the exterior angle Δ of the carrier block or body **13** relative to horizontal, greater than the angle β of the inverted handle relative to horizontal. Angle Δ is formed between horizontal and plane **102** parallel to the underside **24** of block **13**. Force is applied, as indicated by force vector **F** at the inverted mop head, and the downward component of that force is directly applied at **F₁** downwardly to the inverted mop strands **135**,

25 for scrubbing.

An additional aspect of the present invention is a three-step surface treatment process, applicable for example to room surfaces, such as floors and walls. The first step is the application of a flowable spray-on pesticide to the surfaces, including room corners and crevices, which may be accomplished by workers in the evening.

30 The second step is the application of a traction compounds or restorative compounds to adjacent or contiguous surfaces, as for example walkways, the entire room or any surface where the first treatment was applied which may be done by the same workers, and generally at the same time as the pesticide application. Such closely related applications enhance efficiency and enable visible surface area application differentiation, as is useful in relation to

subsequent mopping. The restorative typically chemically reacts with silica or silica-containing materials in the floor.

These steps may then be followed by later application of a mop to the treated surface or surfaces, the mop being aqueously wetted, for example. The restorative materials are 5 typically in aqueous carrier solution, and therefore excess materials may be removed by the absorbing characteristics of the mop, passed back and forth over the surface or surfaces. The mop strands are then squeezed to remove the any excess applied materials picked up.

The mop of the present invention is particularly useful in this process, due to its capability for quick attachment to, and removal from, the carrier block, as via the described 10 adjustable bail, grommet openings and fasteners. Thus, one mop attached to the carrier block may be employed for spreading and/or scrubbing the pesticide sprayed on the surface; it may be easily and quickly removed and a second mop attached to the block for spreading and/or scrubbing the restorative; and after removal of the second mop, a third mop may be attached to the carrier block, for use in picking up the excess flowable materials from the surface.

15 Representative pesticides include the following, which are known:

- botanicals
- pyrethroids
- inorganics
- organophosphates, carbamates, and other neurotransmitter disrupters
- bait toxicants
- fumigants
- insect growth regulators
- others

20 Examples of botanicals include pyrethrum, rotenone, ryania, and di-limonene and 25 other related terpenes.

Examples of inorganics include boric acid, sodium fluoride, silica aerogel (a type of fumed silica), and diatomaceous earth.

Examples of carbamates include carbaryl (SevinTM), propoxur (BaygonTM), and bendiocarb (FicamTM).

30 Examples of bait toxicants include inorganic insecticide boric acid (DraxTM, MRF 2000TM, NiBanTM FG, and others), and the organic materials hydramethylnon (MaxforceTM, SubterfugeTM, and SiegeTM), sulfluramid (ProControlTM and FluorGuardTM), and abamectin (AvertTM).

Examples of fumigants include naphthalene and paradichlorobenzene, aluminum phosphide (Phostoxim™), and magnesium phosphide (Mag Tox™).

Representative surface restoratives to include fluoride-containing compounds selected from the group essentially consisting of hydrofluoric acid, ammonium, bifluoride, or other silica

- 5 reactive or organic acid family groupings. Fluoride-containing compounds may be formulated with institutional and industrial grade fluoride.

Mops, other than those described herein, may be used in the three-step process however, mops, as described herein, are preferred, due to their unusual advantages and use characteristics.

CLAIMS**WE CLAIM:**

- 5 1. Apparatus for scrubbing and mopping a surface, comprising in combination:
 - a) a supporting carrier including a block, and scrubbing means carried by the carrier, to project toward the surface for scrubbing that surface,
 - b) a first means for attaching an elongated handle to the carrier to extend in a first direction from the carrier,
 - c) a manually manipulable structure for adjustably attaching a mop to the carrier with mop strands extending in generally parallel relation with that surface and in mopping contact therewith as the scrubbing means simultaneously engages that surface, for simultaneous mopping and scrubbing of that surface, as the handle extends at an angle to the surface to displace the carrier, scrubbing means and mop parallel to the floor surface, and to
- 10 15 transmit downward force to said scrubbing means, said structure including a bar extending transversely lengthwise of the carrier, for engaging a portion of the mop.
- 20 2. The combination of claim 1 including said mop having a head adjustably attached by said bar which has opposite end portions attached to the carrier, one of said end portions being detachable from the carrier to allow installation of the mop on the bar, and removal of the mop from the bar at a first side of the carrier.
- 25 3. The combination of claim 2 including said handle attached to the carrier at a second side of the carrier spaced from said mop head and wherein said mop head extends in a lateral direction, and said mop strands extend in a longitudinal direction, whereby a plane extending in said longitudinal direction and passing through said handle also bisects said carrier.
- 30 4. The combination of claim 2 wherein the bar comprises a bail carried by the carrier to adjustably swing into and out of mop head clamping position said bail has a releasable locking connection to the carrier to clamp the mop head between the carrier and bail, transversely of the head.

5. The combination of claim 2 wherein said structure includes said bar which is adjustable and has a portion which is angled for engagement, said portion to be forcibly engaged as said portion is received in a recess in the carrier, for adjustably clamping the mop head, said bar having a multiplicity of positions, a first position in which the mop head is

5 removable from attachment to the carrier, and a second position in which the mop head is attached to the carrier.

6. The combination of claim 2 wherein said scrubbing means comprises at least one of the following:

- 10 i) bristles;
ii) pad.

7. The combination of claim 1 including at least one projection on the carrier for engaging the mop head to the block movement of said mop transversely lengthwise of the bar,
15 said mop head including a fabric band to be engaged by a one or more of said projections wherein said projections are transversely spaced apart at said first side of the carrier.

8. The combination of claim 1 wherein said scrubbing means has a releasable attachment to the carrier and said attachment is a releasable mechanical fastener attachment.

20

9. The invention of claim 1 wherein said carrier and scrubbing means have an alternate inverted position in which downward force is directly transmissible from the handle and carrier to the scrubbing means under the carrier.

10. A surface cleaning method which includes providing and employing one or more mops for use in the separate respective steps, and sequentially attaching the one or more mops to a carrier block, to be pushed and pulled via a handle attached to said block and applying treatment material which is flowable and includes at least one of: a pesticide, a
5 surface restorative or traction material, and treating a surface or surfaces with said material by:

a) applying a flowable pesticide material to said surface or surfaces as for example to corners and crevices of a room,

10 b) applying a flowable surface restoration material or traction material to said surface or surfaces, as for example a room or walkway, such application being location and timewise related, as for example, to contiguous surfaces in a room, and the application effected during the same work period or in closely timed relation to said step a),

c) and removing material from said surface or surfaces by providing and passing at least one mop over and in contact with flowable material on said surface or surfaces.

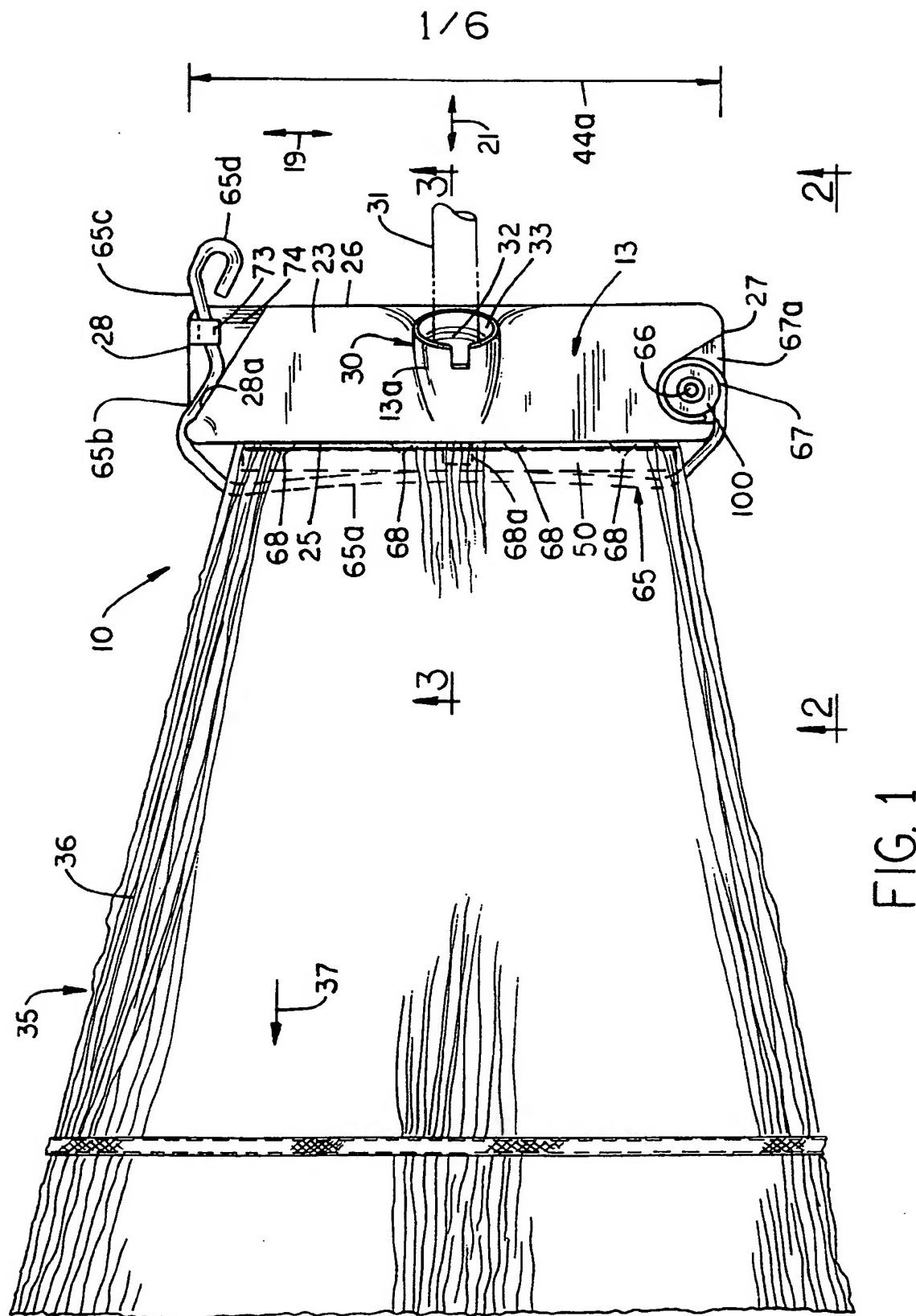
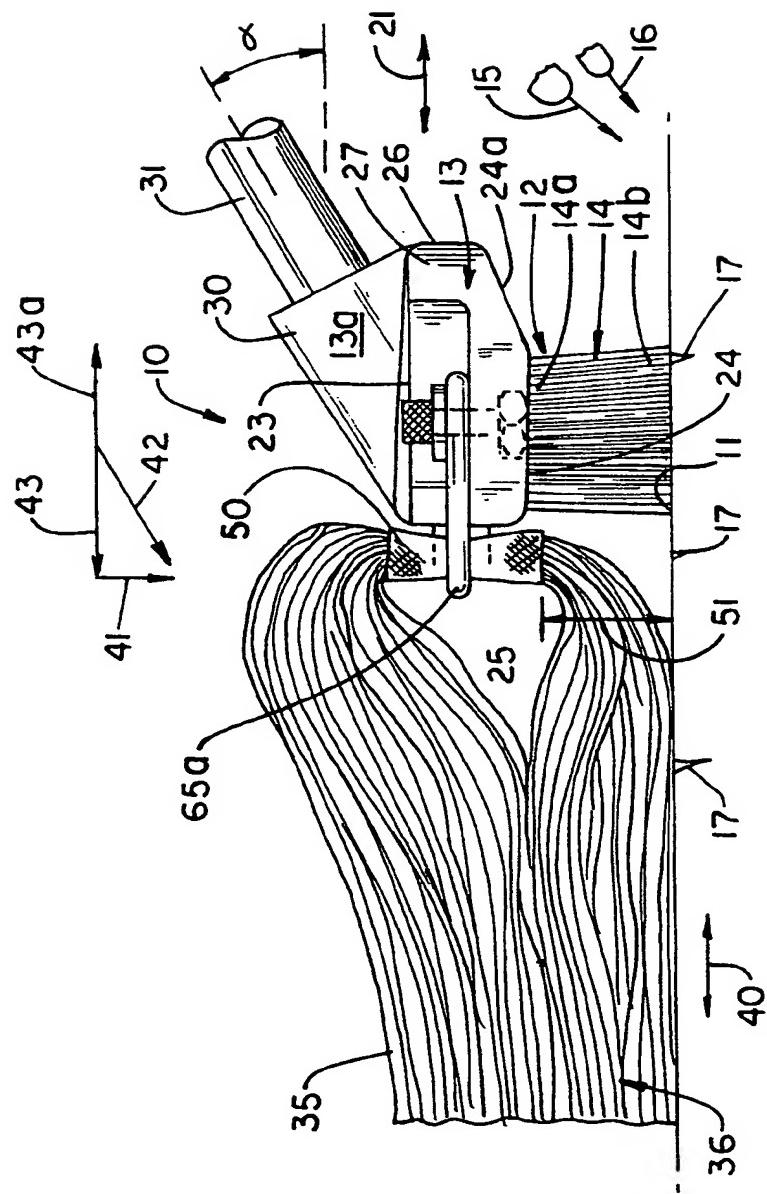
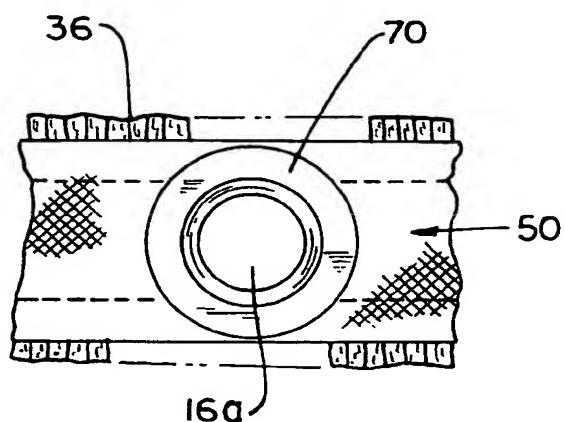
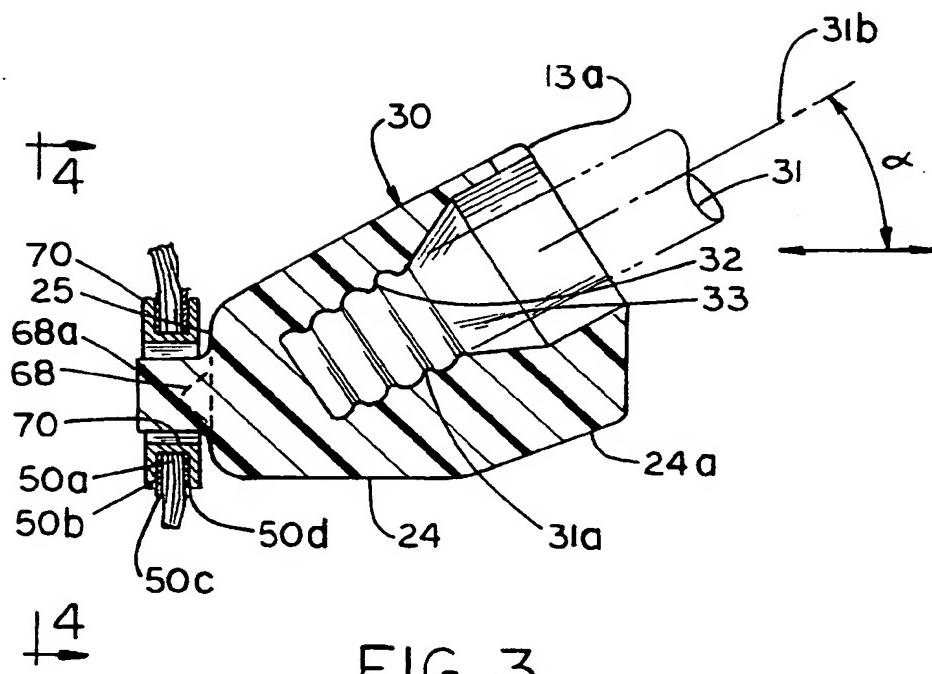


FIG. 1

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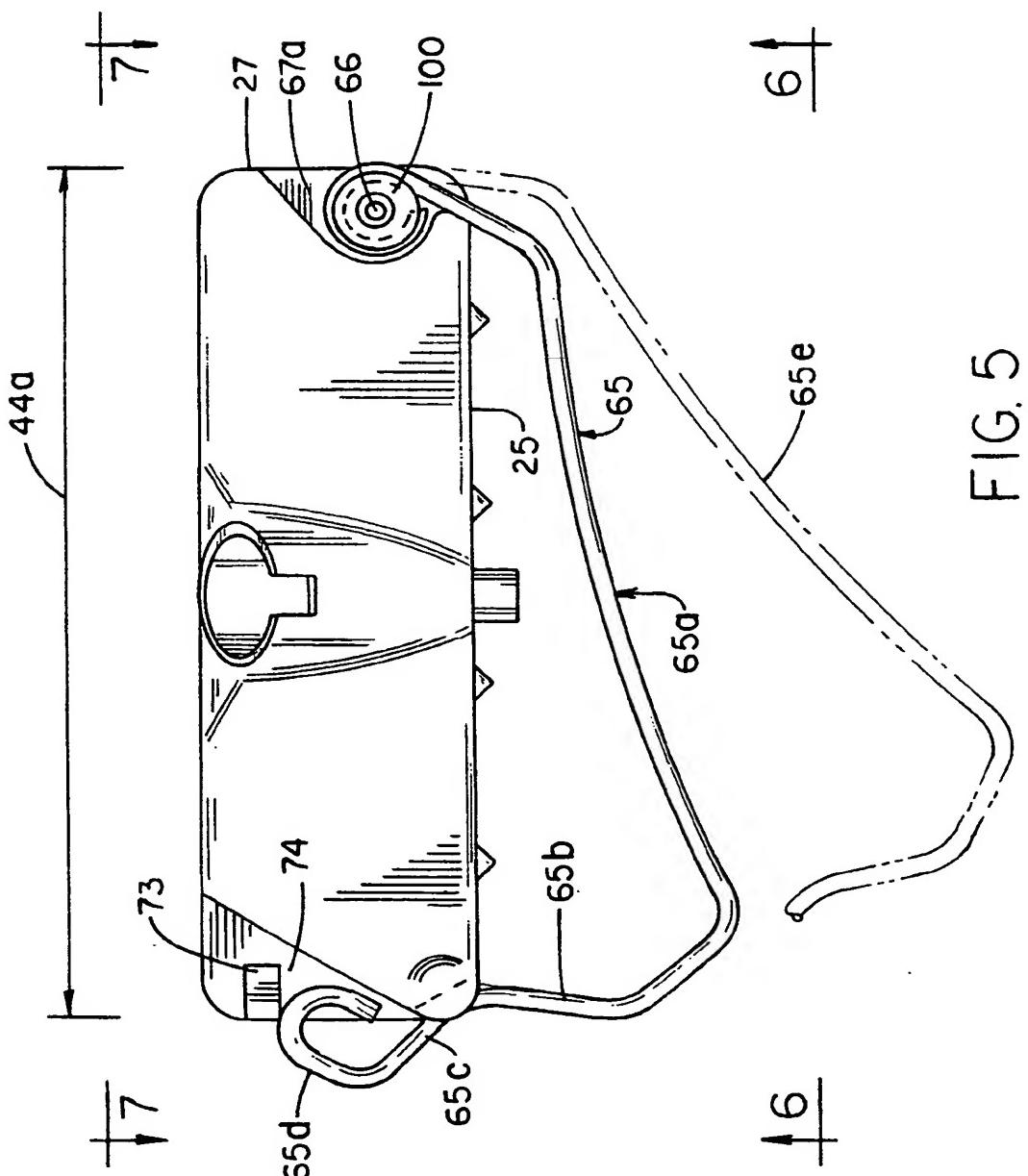
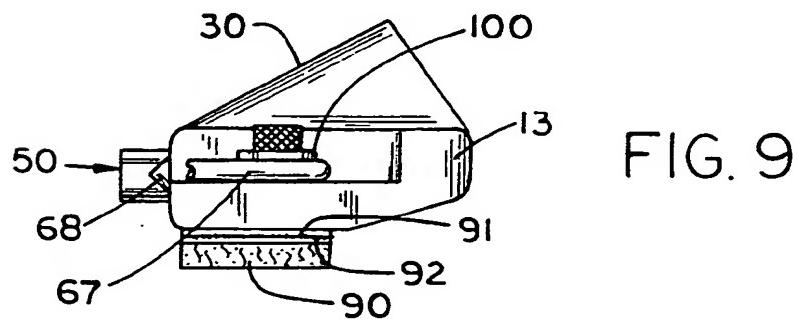
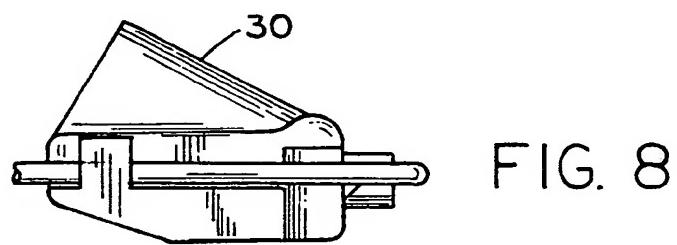
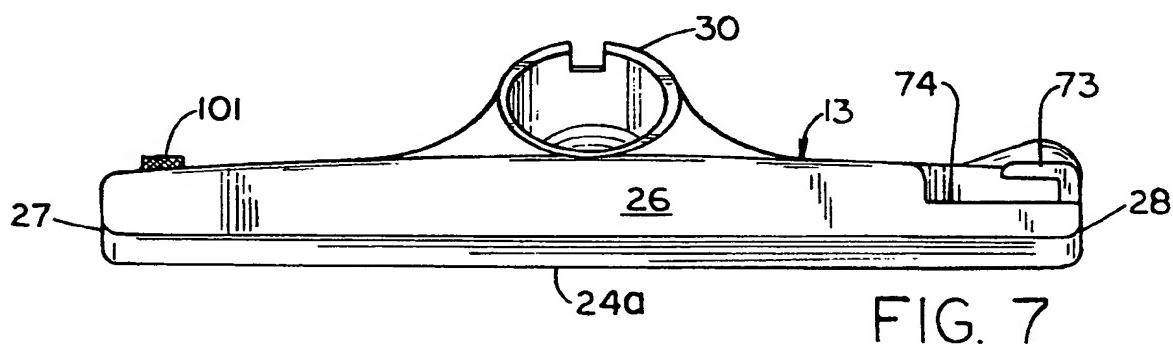
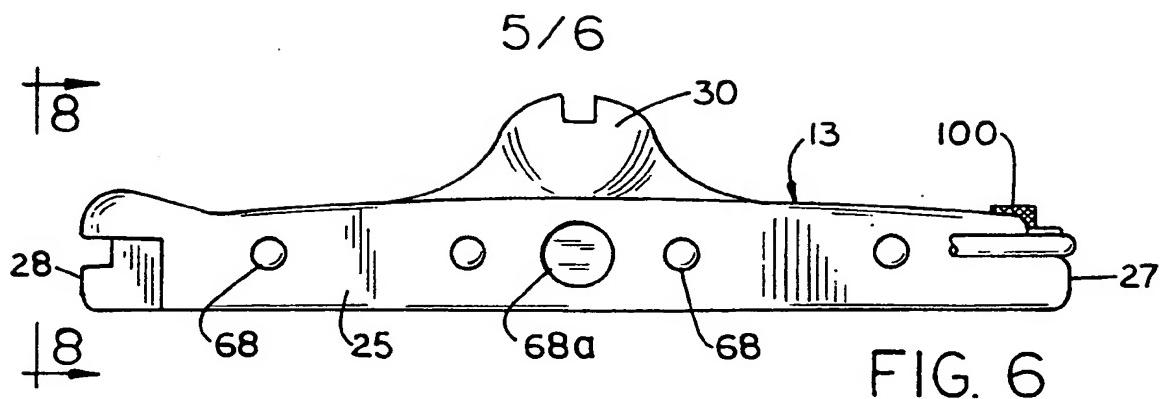


FIG. 5



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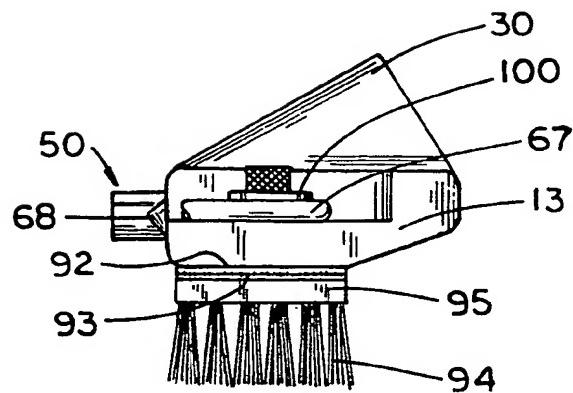


FIG. 10

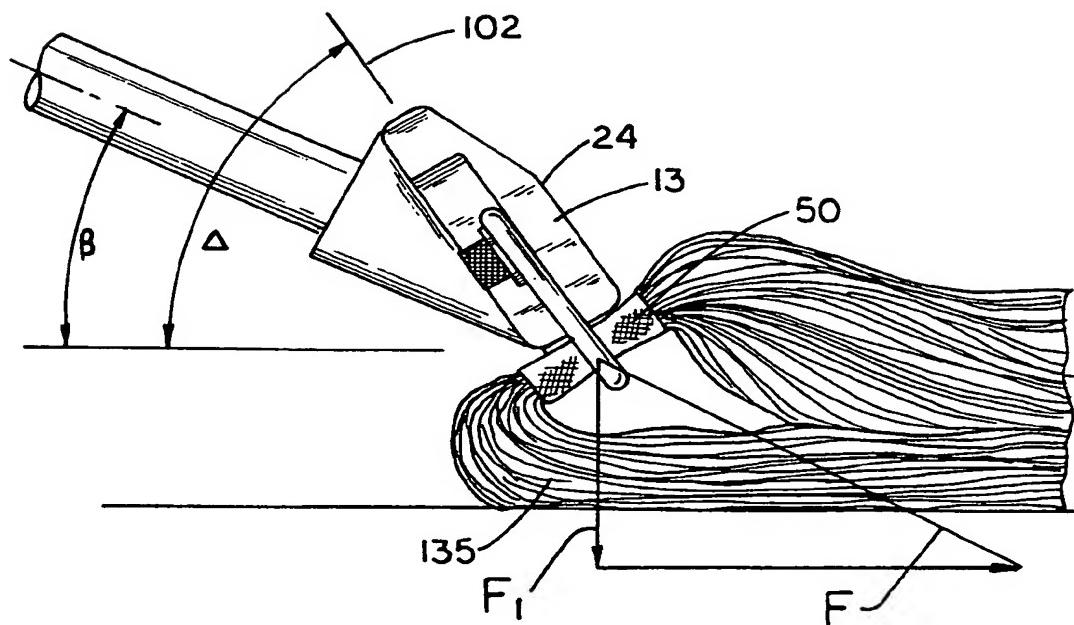


FIG. 11

INTERNATIONAL SEARCH REPORT

International Application No PCT/US 00/01841

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A47L13/12 A47L13/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A47L C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 304 961 A (SCHULMANN S) 15 December 1942 (1942-12-15) column 1, line 34 -column 2, line 53 figures	1, 9
Y	EP 0 864 292 A (SCOT YOUNG RESEARCH) 16 September 1998 (1998-09-16) abstract column 2, line 38 -column 3, line 21 column 4, line 5 - line 9 claim 4 figures 1,2,4,6	2, 4, 6-8
Y	DE 43 30 271 A (VILEDA GMBH) 9 March 1995 (1995-03-09) column 3, line 16 - line 23 figure 2	2, 4, 6, 7
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

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